

**NAVAL RESERVE OFFICERS TRAINING CORPS
NAVAL SHIPS SYSTEMS II (WEAPONS)**

LESSON TOPICS

<u>LESSON NUMBER</u>	<u>TITLE</u>	<u>HOURS</u>
1	Introduction/Weapons System Overview	1
2	Energy Fundamentals	2
3	Radar Principles and Systems	3
4	Feedback Control/Automatic Tracking Systems	2
5	Track-While-Scan (TWS)	1
6	Electronic Scanning and the Phased Array	1
7	<u>Case Study:</u> USS Vincennes	2
8	Electronic Warfare	2
9	C ⁴ ISR and Information Warfare	2
10	Principles of Underwater Sound	3
11	Underwater Detection and Tracking Systems	2
12	Military Explosives/Warheads	2
13	Fuzing	1
14	Guidance and Control Principles	1
15	Weapon Propulsion and Architecture	2
16	<u>Case Study:</u> OOD Midwatch	1
17	Launching Systems	1
18	Fire Control	2
19	Mine Warfare	2
20	U.S. Navy and Marine Corps Platforms and Weapons	4
21	<u>Case Study:</u> Aircraft Mishap Incident	1
22	Personnel Qualification Standards (PQS)	1
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		Total: 39

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INSTRUCTIONAL AIDS

1. Videotapes: See videotape list (below).
2. PowerPoint Presentations/Slides: The current PowerPoint presentations for the Weapons Systems lessons can be downloaded from the NROTC curriculum website at <https://www.cnet.navy.mil/cnet/nrotc/cig.html>.
3. Instructional Materials

Overhead Projector
Videocassette Player
DVD Player
TV Monitor
Computer with large-screen projection system/LCD projector
4. Transparencies may be produced locally from PowerPoint slides or other sources, if desired.
5. Internet Web Sites: Numerous World Wide Web sites are available for exploration. At a minimum, instructors should be aware of the following sites and should encourage students to "surf the net" for additional information.
 - Surface Warfare Officers School Command:
<http://www.swos.navy.mil>
 - United States Navy Fact Files:
<http://www.chinfo.navy.mil/navpalib/factfile/ffiletop.html>
 - Office of Naval Research: <http://www.onr.navy.mil>
 - U.S. Naval Research Laboratory: <http://www.nrl.navy.mil>
 - Naval Postgraduate School: <http://www.nps.edu>
 - USNA Weapons Department:
<http://www.usna.edu/Library/Engineer/Weaponsmain.htm>
 - USNA Principles of Naval Weapons Systems Blackboard:
<http://www.blackboard.usna.edu> (Contact NSTC Code OD32 for access to USNA Blackboard.)
6. Other Aids: Other information may be acquired by accessing websites of the Defense Contractors listed in Jane's Naval Weapons Systems.

VIDEOTAPES

1. Videotapes may be extremely useful in highlighting key points and providing visual demonstrations. (Note that the use of the terms "videotape" and "video" in this guide is synonymous with "movie," regardless of the media format; however, the videotape format is the main one provided by Navy at the time of this writing.) The instructor should review the identified video during class preparation and decide how to best use it in class to enhance the students' overall learning experience. Instructors should use videos as supplemental materials and not rely on them to cover entire subject areas. The use of videos allows almost any training environment to be brought into the classroom, but it may be best to use short segments of a video rather than the entire length.
2. The following videos are part of the official Weapons Systems curriculum and have previously been distributed to each unit. These videos should be controlled and serialized as part of the unit's standing educational materials and maintained in good working condition. Replacements for damaged videos may be ordered from the NETPDTC Regional Visual Information Center by contacting Mr. Ron Burk at ronald.burk@navy.mil or (850) 452-1001, extension 2020.

Lesson Guide 7: Case Study: USS Vincennes

"Seven Minutes That Stunned the Navy" (Commercial), 50 min

Arts and Entertainment Network documentary regarding the USS Vincennes shootdown of Iran Air Lines, Flight 655.

Lesson Guide 11: Underwater Detection and Tracking Systems

"Tracking the Threat" (#35798), 23 min

Describes tracking and destroying a submarine threat using several U.S. Navy platforms and ASW techniques.

Lesson Guide 14: Guidance and Control Principles

"Warship" (Commercial), 30 min

An excellent description of surface warfare electronics and weapons. Based on the capabilities of the USS *Lake Champlain*. Use the section on Tomahawk guidance systems.

Lesson Guide 17: Launching Systems

"Tomahawk" (#34648), 3 min

"Sea Warriors"
(#802298), 15 min

A description of surface warfare based on the early *Ticonderoga* class cruisers (non-VLS). Good discussion of the *Ticonderoga* as a multi-mission platform. Use the section on the transfer and launching of an SM-2MR missile.

"Warship" (Commercial), 30 min

An excellent description of surface warfare electronics and weapons. Based on the capabilities of the USS *Lake Champlain*. Shows several different launchers, including those for Harpoon and Tomahawk.

Lesson Guide 20: U.S. Navy and Marine Corps Platforms and Weapons

"Top Gun" (#35206), 14 min

A look at the U.S. Navy's Fighter Weapons School and the training and capabilities of the Top Gun pilot. Presented by the Northrop Corporation.

"Today's Submarine Force" (#805240), 19 min

Explains the different missions and capabilities of a submarine.

"Sea Power for the 90's" (#804818), 18 min

Explains the use of U.S. naval forces in modern-day conflicts. Includes discussion on the new missions of the Navy.

"Sea Warriors" (#802298), 15 min

A description of surface warfare based on the early *Ticonderoga* class cruisers (non-VLS). Good discussion on the *Ticonderoga* as a multi-mission platform.

"Warship" (Commercial), 30 min

An excellent description of surface warfare electronics and weapons. Based on the capabilities of the USS *Lake Champlain*.

"Storm from the Sea" (Commercial), 67 min

The U.S. Naval Institute video of the Navy and Marine Corps operations in the Gulf War. Includes interviews and combat action footage.

3. Some Hollywood and other commercial movies contain material relevant to this course. Students often find such movies interesting and normally questions abound. Class discussions can be lively and may help to separate fact from fiction in matters surrounding naval operations and protocol. Some movies that may be suggested for viewing outside of class include, "Top Gun," "Crimson Tide," "The Hunt for Red October," and "Courage Under Fire."
4. Most universities have video libraries or audiovisual organizations that can provide current, topical films to units at no cost. These universities may also have additional funding or arrangements to purchase video rights and rental for use in the classroom environment. Consult with your university's film librarian to locate additional films to support lesson plans.
5. A wide variety of Department of Defense (DOD) materials is available through the Defense Automated Visual Information System/Defense Instructional Technology Information System (DAVIS/DITIS) website at:
<http://dodimagery.afis.osd.mil/davis/>. This site contains listings and descriptions of thousands of audiovisual productions/videotapes and interactive multimedia instructional products used by DOD. The NETPDTC Norfolk Regional Electronic Media Center may also be able to provide desired multimedia resources, by contacting Mr. Ron Burk at ronald.burk@navy.mil or (850) 452-1001, ext. 2020.
6. There are various online vendors and resources instructors may consult when looking for video resources for

educational purposes. At little or no cost, the instructor may obtain resources used by the United States Naval Academy; resources available on various educational institution websites; archived resources at network television web sites; or government and military-related issues archived by C-SPAN at: <http://www.c-span.org/>. The Course Coordinator may be contacted for assistance in locating video resources.

7. **Instructors should be aware that commercial videos provided by NSTC or purchased by the unit are for use in an academic setting only. They are not to be reproduced, sold, copied, or shown in their entirety. Academic privileges allow instructors to utilize portions of videos, books, articles available to the public, and other media in academia to teach and educate. Using or distributing these videos in any fashion other than outlined here and in the lesson plans may constitute copyright infringements. Many short video clips from commercial movies provide the instructors contemporary, intriguing material to provide the students with examples of the ethical issues they are trying to teach. Use these segments appropriately. Seek official legal advice for any use not mentioned in this guide. Additional guidance may be found in SECNAVINST 5870.4.**

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BIBLIOGRAPHY

1. Texts (1 per student, 1 per instructor)

Hall, Joseph, CDR, USN, ed. Principles of Naval Weapons Systems. Dubuque, IA: Kendall/Hunt Publishing Co., 2000.

Naval Doctrine Command. Naval Intelligence. Naval Doctrine Publication 2. Washington, D.C.: GPO, 1995.
(Available online at:
http://www.dtic.mil/doctrine/jel/service_pubs/ndp2.pdf.)

2. References (1 per instructor)

** Indicates essential references that are provided by NSTC OD3. The other references are not essential to the teaching of the course but can provide clarifying or amplifying information. The individual unit should take measures to obtain copies of references, if their use is desired.

NOTE: Instructors should incorporate current and past articles from magazines such as Surface Warfare, Proceedings, and Aviation Week and Space Technology, as they apply to the various subjects. Although some particular articles may be listed in the bibliography and the lesson guides, it should not be assumed to be an exhaustive listing of applicable articles.

Barry, John and Roger Charles. "Sea of Lies." Newsweek, 13 July 1992: pp. 29-39.

** Chairman of the Joint Chiefs of Staff Office. Joint Vision 2010. (Available online at
<http://www.dtic.mil/jointvision/history/jv2010.pdf>.)

Church, George J. "High-Tech Horror." Time, 18 July 1988: pp. 14-17.

Department of Defense. Defense 92. Alexandria, VA: American Forces Information Service, 1992.

** Department of Defense. Final Report to Congress: Conduct of the Persian Gulf War. Washington D.C.: GPO, April 1995.

- ** Department of Defense. Joint Warfare of the U.S. Armed Forces. Joint Publication 1. Washington, D.C.: National Defense University Press, 1995. (Available online at: http://www.dtic.mil/doctrine/jel/new_pubs/jpl.pdf.)
- ** Department of Defense. Doctrine for Command, Control, Communications, and Computer (C⁴) Systems Support to Joint Operations. Joint Publication 6-0. Washington, D.C.: National Defense University Press, 30 May 1995. (Available online at: http://www.dtic.mil/doctrine/jel/new_pubs/jp6_0.pdf or latest edition of Joint Electronic Library CD-ROM.)
- ** Department of the Navy. Force 2001: A Program Guide to the U.S. Navy. Washington, D.C.: Deputy Chief of Naval Operations, Resources, Warfare Requirements and Assessment (N8), 1997.
- ** Department of the Navy. ...From the Sea, Preparing the Naval Service for the 21st Century. Washington, D.C.: GPO, September 1992. (Available online at: <http://www.chinfo.navy.mil/navpalib/policy/fromsea/fromsea.txt>.)
- ** Department of the Navy. Forward...From the Sea. Washington, D.C.: GPO, 1994. (Available online at: www.chinfo.navy.mil/navpalib/policy/fromsea/ffseanoc.html)
- ** Friedman, Norman. The Naval Institute Guide to World Naval Weapons Systems, current edition. Annapolis, MD: Naval Institute Press.
- ** Hartmann, Gregory K. and Truver, Scott C. Weapons That Wait: Mine Warfare in the U.S. Navy. Annapolis, MD: Naval Institute Press, 1991.
- ** Lambert, Mark, ed. Jane's All the World's Aircraft 2004-2005. Alexandria, VA: Jane's Information Group, Inc.
- ** Libicki, Martin, C. What Is Information Warfare? Washington, D.C.: National Defense University Press, 1995.
- MacDonald, Scot. "Slick Warriors and the '32'." Surface Warfare, January/February 1990: pp. 14-17.

- McClane, Joseph L. Jr., CAPT, USN (Retired) and James L. McClane, CDR, USN. "The *Ticonderoga* Story: Aegis Works." Proceedings/Naval Review, 1985. Annapolis, MD: Naval Institute Press, 1985, pp. 118-129.
- ** Naval Doctrine Command. Naval Command and Control. Naval Doctrine Publication 6. Washington, D.C.: GPO, 1995. (Available online at: www.dtic.mil/doctrine/jel/service_pubs/ndp6.pdf.)
- ** Naval Doctrine Command. Naval Warfare. Naval Doctrine Publication 1. Washington, D.C.: GPO, 1994. (Available online at: http://www.dtic.mil/doctrine/jel/service_pubs/ndp1.pdf.)
- Naval Education and Training Command. Damage Controlman 3&2. NAVEDTRA 10572. Washington, D.C.: GPO, 1986.
- ** Naval Education and Training Activity. Mine Warfare Supplementary Text. SAUF 32537 (8-91).
- Naval Mine Warfare Engineering Activity. NAVSEA Mine Familiarizer. Yorktown, VA: Naval Mine Warfare Engineering Activity, April 1985.
- Naval Mine Warfare Engineering Activity. U.S. Navy Mine Countermeasures Familiarizer. Yorktown, VA: Naval Mine Warfare Engineering Activity, October 1991.
- NAVEDTRA 43100-1G, "Personnel Qualification Standards Unit Coordinator's Guide" (Available online at: <https://pgs.cnet.navy.mil/m43100-1f.pdf>.)
- NAVEDTRA 43100-5T, "PQS Catalog" (Available online at: <https://pgs.cnet.navy.mil/books/43100-5T.pdf>.)
- OPNAVINST 3500.34E, "Personnel Qualification Standards (PQS) Program" (Available online at: https://pgs.cnet.navy.mil/3500_34e.pdf.)
- Payne, Craig, LCDR, USN, ed. Principles of Naval Weapons Systems (Draft). Annapolis, MD: Naval Institute Press, 2004.
- Sabalos, Nicholas Jr., ed. "C⁴I for the Warrior." Surface Warfare, July/August 1995: pp. 2-27.

- Sabalos, Nicholas Jr., ed. "...Now Build the Best." Surface Warfare, September/October 1996: pp 11-35.
- ** Sharpe, Richard, CAPT, RN, ed. Jane's Fighting Ships, 2003-2004. Alexandria, VA: Jane's Information Group, Inc.
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RECOMMENDATIONS FOR THE INSTRUCTOR

1. Instructor References: The references listed in this curriculum guide are useful resources for the instructor. The reference information is abbreviated in the lesson guides; full bibliographical information can be found in the bibliography. It is imperative to keep the lessons and examples current by also reading periodicals such as Surface Warfare, Proceedings, and Aviation Week and Space Technology. References to current world events, weapon deployment in recent conflicts, and popular movies and books add much to this course and lead to better student understanding and increased interest.
2. Teaching Techniques: This course lends itself to a variety of teaching methods. Experiment with different interactive learning techniques, which are far more effective than the standard lecture format. Many instructors have found student presentations and guest lecturers (even other instructors from the unit or recent graduates) to be effective methods of keeping the students interested. Use multimedia demonstrations as often as possible without becoming dependent upon them to do the teaching.
3. Student Assignments: Instructors should be thoroughly familiar with the textbook before assigning homework or reading.
4. Lesson Guide Organization: Lesson topics are grouped in the same general order as the textbook. Instructors may shift the sequence to derive maximum benefit from guest speakers, field trips, or other unit education and training activities.
5. Professional Core Competencies: The instructor should be thoroughly familiar with the Professional Core Competencies (PCCs). It is incumbent upon the instructor to ensure all PCCs are mastered by the midshipmen. With the permission of the Professor of Naval Science, the instructor may modify the course, as long as the PCCs are met. Instructors should ensure they are not focusing the course only upon the warfare areas or platforms with which they are familiar. The midshipmen should leave this course with an equal understanding of the platforms and weapons used by all four U.S. Navy warfare areas and by the U.S. Marine Corps.